.0Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Muddy Creek and Brushy Creek

Waterbody Segment at a Glance:

County: Pettis
Nearby Cities: Sedalia
Length of impairment:
Muddy Creek None
Brushy Creek None
Pollutants:
Muddy Creek None
Brushy Creek None

Source: None


State map showing location of watershed

These creeks were delisted on the 2002 303(d)

TMDL Priority Ranking: TMDL Completed 2002

Description of the Problem

Beneficial uses of Muddy and Brushy creeks

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

Use that was impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- The Missouri Water Quality Standard, found in 10 CSR 20-7.031 Table A, for dissolved oxygen (related to Biochemical Oxygen Demand, or BOD) in streams is 5.0 mg/L (milligrams per liter or parts per million).
- Ammonia (NH_3-N) standards vary depending on the pH and the temperature. Ammonia limits for a Limited Warm Water Fishery (at a pH of 7.8) are 2.0 mg/L for summer and 3.3 mg/L during the winter. The ammonia tables are found at 10 CSR 20-7.031 Table B.
- Standards for Volatile Suspended Solids (VSS) may be found in the general criteria section of the Water Quality Standards, 10 CSR 20-7.031(3)(A) and (C) where it states:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

Any waterbody that was listed for Non-Filterable Residue (NFR) in 1998 is now being listed as Volatile Suspended Solids (VSS). The new listing gives a clearer picture of the specific sources contributing to the impairment. VSS are organic solids coming from wastewater treatment plants. The term "NFR" will, however, be retained in the approved TMDL document.

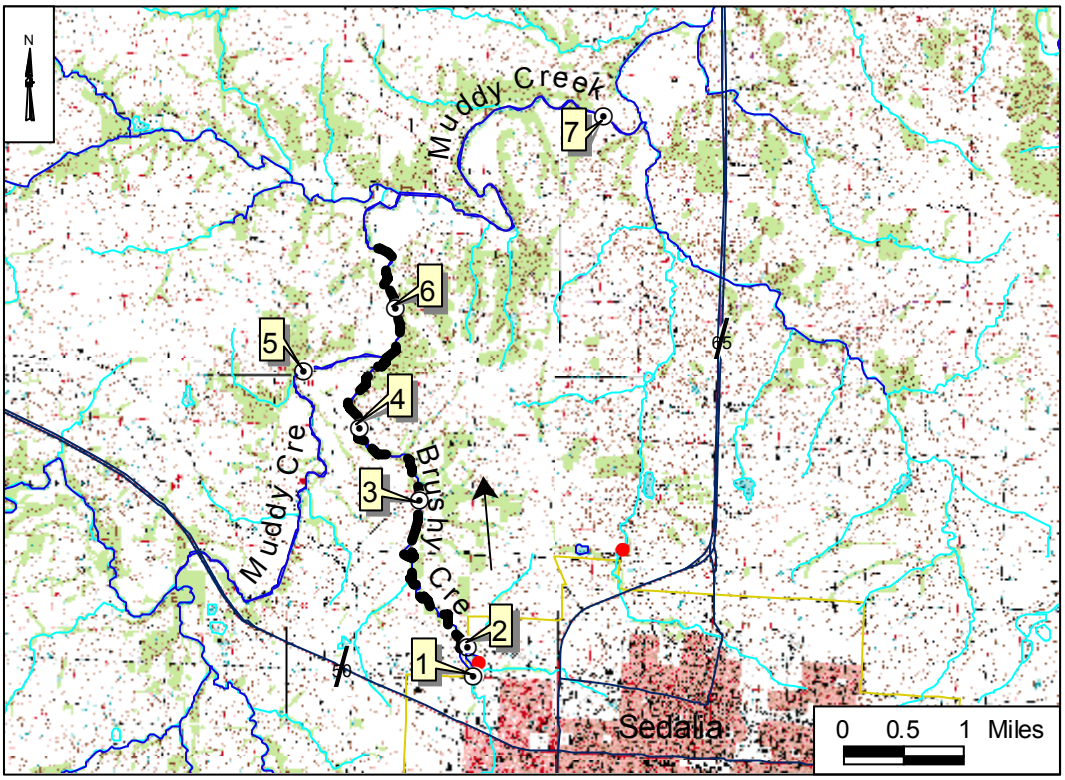
Three miles of Muddy Creek were placed on the 1998 303(d) list for high Biochemical Oxygen Demand (BOD). Thirty-three miles of Brushy Creek (a tributary to Muddy Creek) were listed for low BOD, excessive NFR and violations of the Ammonia (NH_3-N) water quality standards. The number of miles was corrected to 1 and 3 miles respectively in the completed TMDL.

NH_3-N is a common by-product of wastewater treatment and under certain conditions can be toxic to aquatic life. On September 3, 1992 there was a fish kill in 2.5 miles of Brushy Creek and one mile of Muddy Creek due to high levels of ammonia from Sedalia Central Wastewater Treatment Plant (WWTP). There was another fish kill on July 14, 1994, due to toxic concentrations of ammonia. Also, wastewater that is high in BOD lowers the dissolved oxygen in a stream. Many aquatic organisms require high levels of oxygen to survive. Low levels of oxygen have been documented frequently in both creeks. VSS refer to particles that are suspended in water, like algae, or those that settle out, like the sewage sludge in Brushy Creek. When these solids settle onto the streambed, they smother natural substrates (stream bottom), aquatic invertebrate animals, and fish eggs. Previously, conditions in these streams have not been protective of aquatic life.

Stream surveys were conducted on Muddy and Brushy creeks during August 24-26, 1993, and again in August 29-31, 1995, as part of a wasteload allocation study. The purpose of the surveys was to quantify pollutant loading from the Sedalia Central WWTP during minimal summer flows. Additional monitoring was done in 1996, 1997 and 1998. As a result, the Sedalia Central WWTP upgraded their facilities to meet more stringent treatment requirements in 1998-2000. More data was collected in 2000, 2001 and 2003 to evaluate the effectiveness of improvements at the wastewater treatment plant. Data from the 2001 and 2003 water quality studies indicated that the previously impaired portions now meet water quality standards. A map of the area and three graphs summarizing the existing data may be found below.

The U.S. Environmental Protection Agency approved the TMDL for Muddy Creek and Brushy Creek on February 11, 2002 and these two streams were removed from the 2002 303(d) List. The TMDL establishes an instream target of 35 mg/L for NFR based on Discharge Monitoring Report data. It also requires a vigorous monitoring plan that was included in Sedalia's permit when it was renewed in June 2002. If future monitoring shows that water quality standards are not being met, the TMDL will be reopened and adjusted as needed.

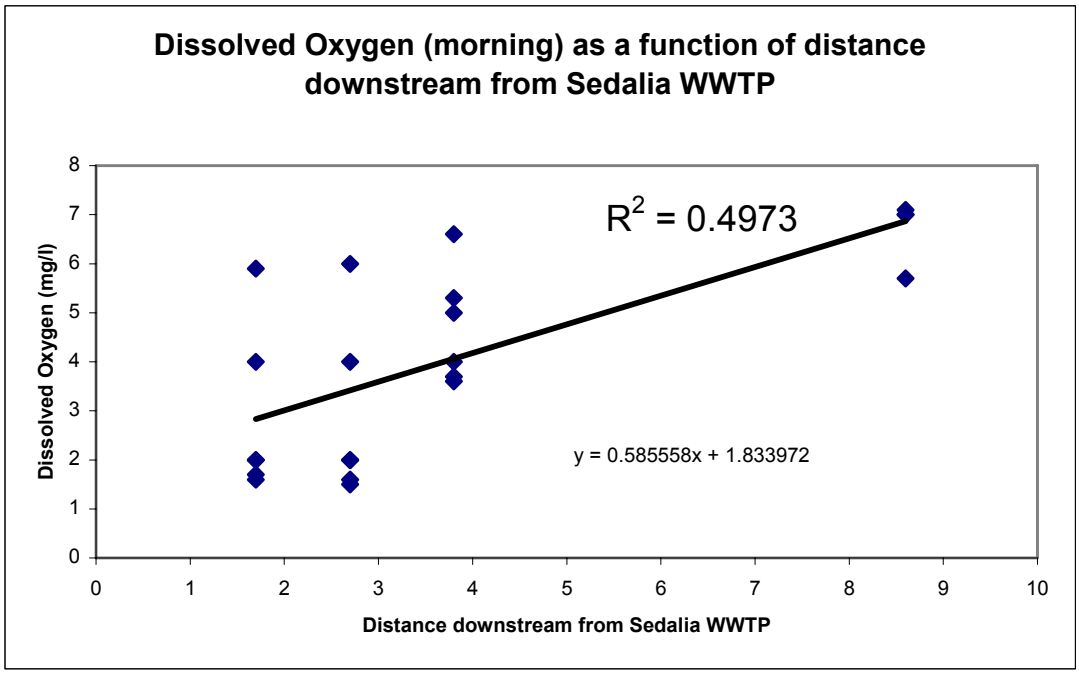
Muddy and Brushy Creeks in Pettis County, Missouri, with Sampling Sites



Impaired Segment ← Direction of Flow

Site Index

1 – Brushy Creek 0.25 mile upstream of Sedalia Central WWTP
2 – Sedalia Central WWTP effluent
3 – Brushy Creek 1.7 miles downstream of Sedalia Central WWTP
4 – Brushy Creek at Cloney Road
5 – Muddy Creek at Yeater Road
6 – Muddy Creek at Treasure Road
7 – Muddy Creek at McCurdy Road



Source: Missouri Department of Natural Resources

This graph is based on samples taken during morning hours at times of low flow in 1993, 1995, 2000, and 2001.

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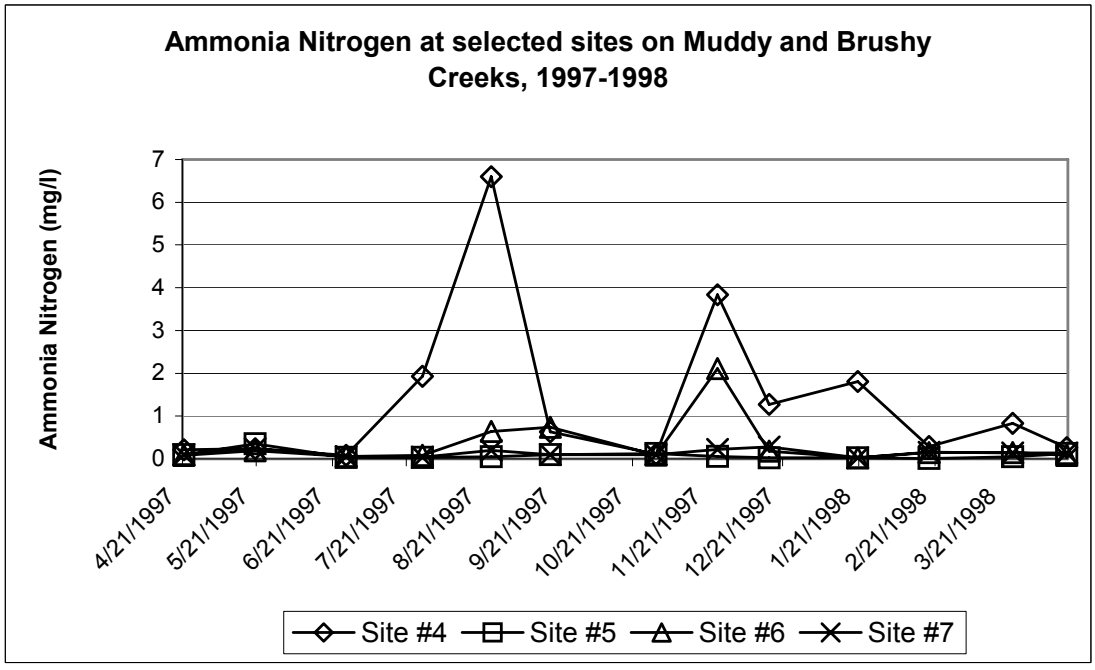
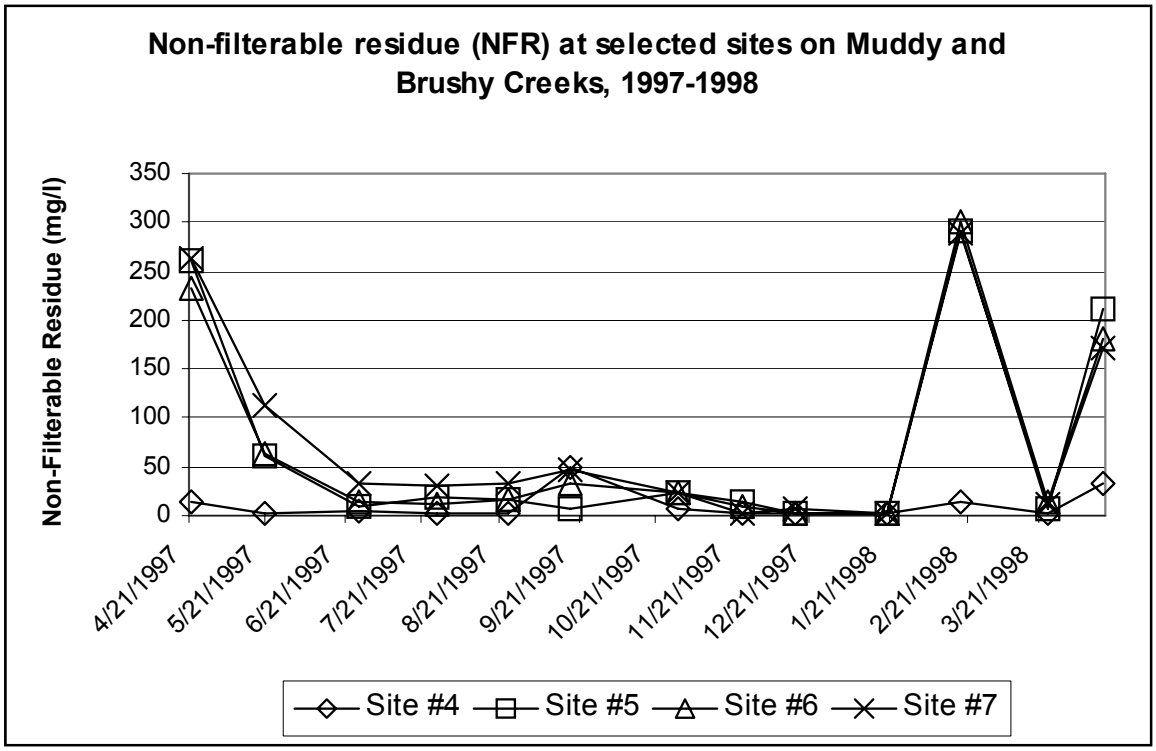
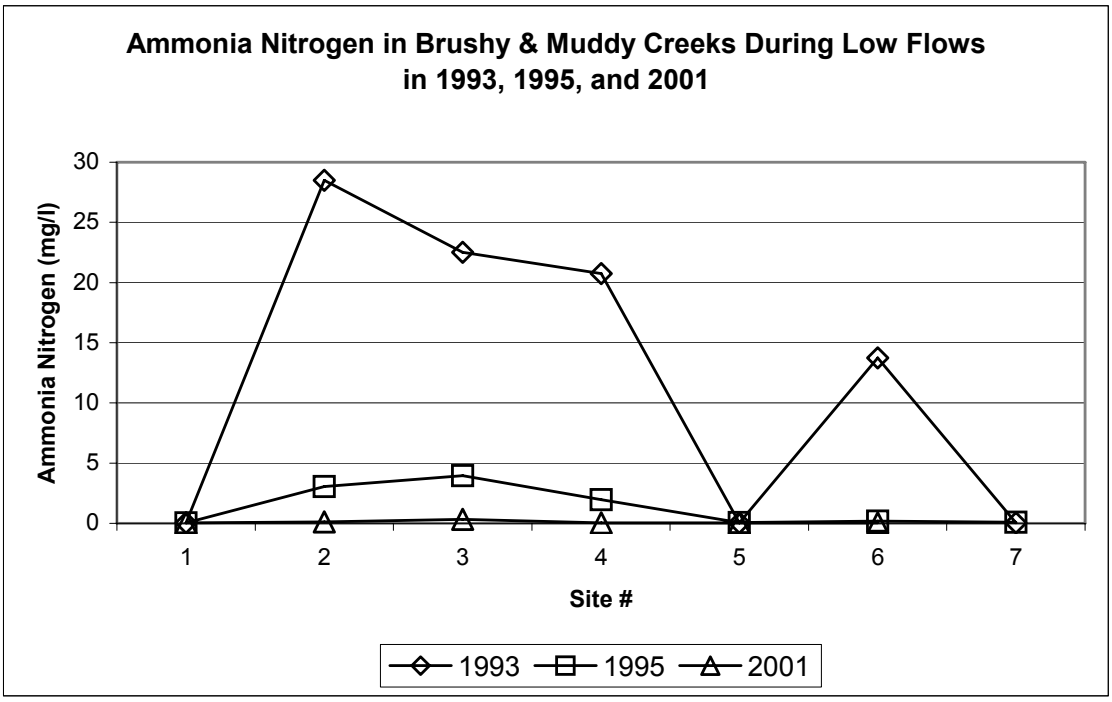


Sedalia Central's ammonia limits: 2.5 mg/L from May 1-Oct 31 and 3.5 mg/L from Nov 1-April 30. Note: Permit limits are higher than the instream water quality standards.



Source: Missouri Department of Natural Resources



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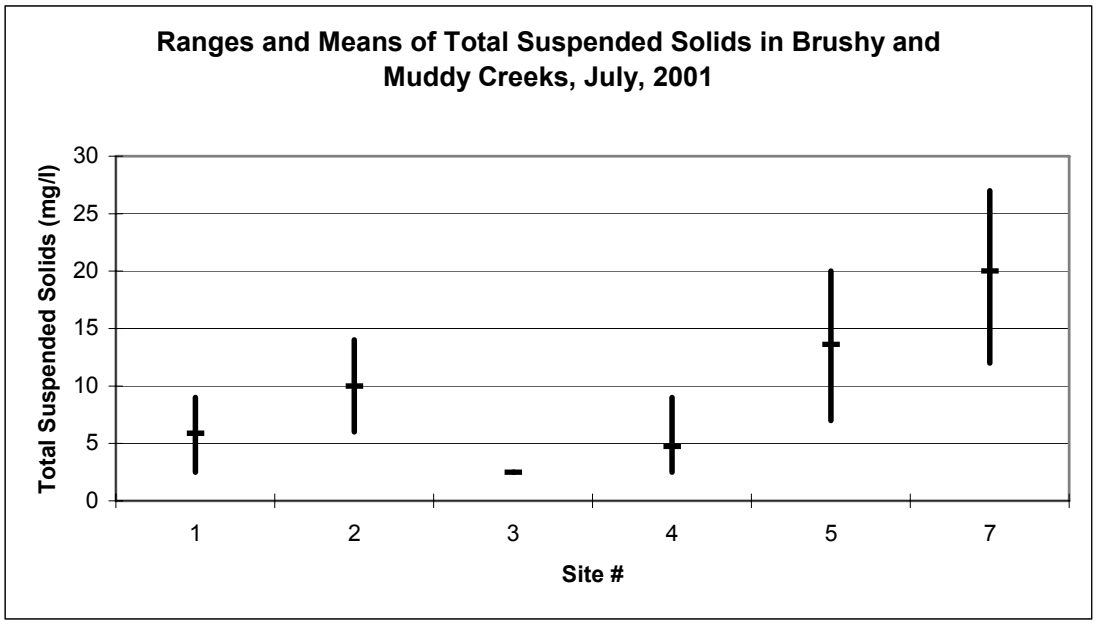

Source: Missouri Department of Natural Resources.

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